Manitoba

Agriculture

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Dairy Facts

Dairy Heifer Management: Charting Heifer Growth

The trend today in dairy herd management is to have first-calf heifers freshen at younger ages. Many are bred to calve at 23 to 25 months, a sound practice provided the heifers are **well grown from birth.**

A well-grown dairy heifer is one that has desirable **size** for her age. Size in dairy cattle, as in humans, must be measured in two dimensions — **height** (stature) and **weight**. Recording size among heifers only by weights is misleading because weights do not distinguish between frame and fat.

Our top producers have been using stature measurements in describing size for years, and stature is identified on bull proofs as a desirable genetic trait. The height of a cow is considered important because height has a correlation with the length of a cow's body. The taller the cow, the longer the body, and length of body is a major dimension in measuring body capacity. Tall cows have udders higher off the ground, which is important for injury prevention, cleanliness and ease of milking. Tall animals are desirable on the farm, at the shows and at sales.

Most breeders select sires which they believe will improve stature as well as other desirable genetic traits. However, few dairy producers take stature measurements until the heifers approach calving. At that time "the button on their shirt" tells them the heifer is 15 cm (six in.) shorter than she should be. Now it is too late to recover the lost height. The question is when, why or where did she lose the height? If a heifer is born with the genetic inheritance to be 142 cm (56 in.) tall at maturity, how tall should she be at various ages to fulfill this inheritance? It is important that a guide be available to provide objectives for height and weight of heifers from birth to 24 months of age.

Charting Growth

Measure height at the top of the shoulder using a measuring stick with a crossarm (Photo 1). The crossarm should include a spirit level for accuracy. Commercial heart girth tapes are easy to use and sufficiently accurate for taking weights (Photo 2).

Measurements from high quality animals were used to upgrade existing growth measurements to produce a meaningful, challenging, and yet attainable chart. Three separate graphs have been prepared: Holstein and Brown Swiss (Figure 2); Ayrshire and Guernsey (Figure 3); and Jerseys (Figure 4). Positive results were obtained by testing these graphs on 5,560 heifers in 160 herds during 1980-81. Working copies of these graphs are included in this factsheet. Enlarged copies are available from local Manitoba Agriculture offices.

One graph records the size of every heifer on the farm, at a given date, from birth to 24 months of age. Each heifer will be entered on the graph twice, once for stature and once for weight. Plot height and weight in different colors to make the graph more legible and easier to interpret. The two insertions for each heifer will describe her height, weight and body condition for age, and how these relate to the lines on the graph. When complete, a perfect picture graph of the heifer rearing program is created.

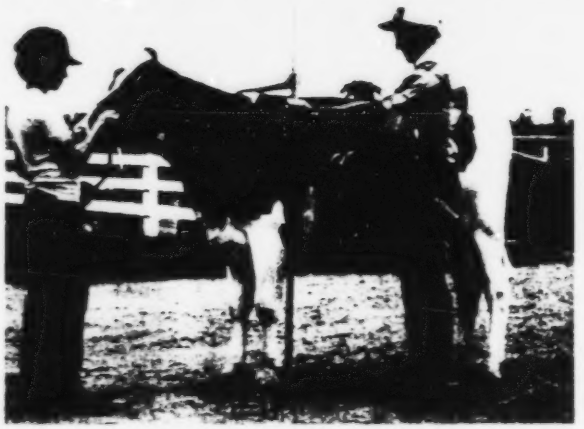


Photo 1. Using a measuring stick equipped with a spirit level in the crossarm to measure a heifer's height at the withers. The heifer and stick should be on a level surface. Hold the heifer's head as indicated in the photo.

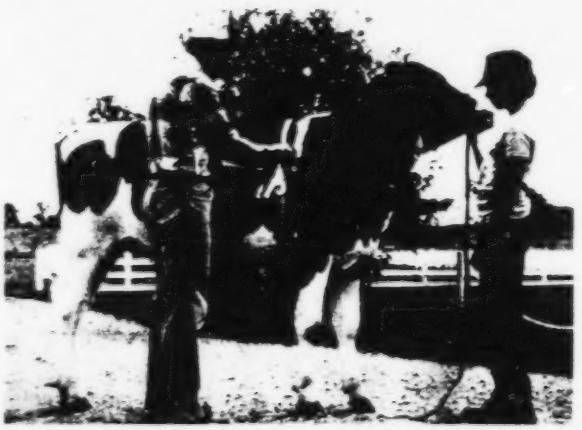


Photo 2. Using a heart girth tape to estimate a heifer's body weight. Hold the heifer's head as indicated in the photo.

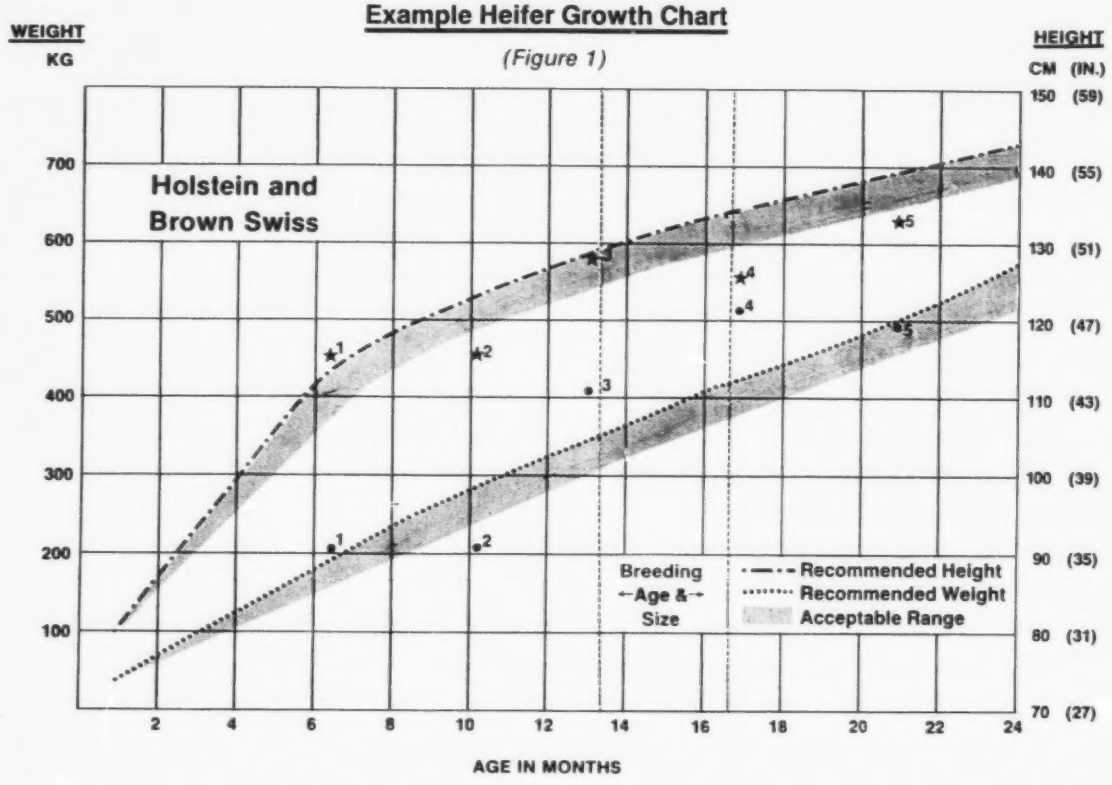
Data for the graph is collected on a Heifer Appraisal Form (Table 2). Additional space is available for body condition scoring of each heifer. Condition scoring is defined as categorizing a heifer's body condition on a scale of one (thin) to five (fat). Comments with respect

to feeding, housing and management can be noted on the back of the form.

These charts provide an excellent way to evaluate your heifer rearing program. They can be reassuring to the herd owners doing a good job and an eye opener to the owners who need to improve. The graph provides an in-herd method to check growth, and is not intended to compare heifers in different herds. The charts will identify the age at which heifers start to slip in height or weight and the owner must identify the cause.

Example Heifer Growth Chart

(Figure 1)



This example growth chart shows how to use the graph. Heifer No. 1 is 6-1/2 months old. She is 115 cm (45 in.) tall and weighs 200 kg (440 lb.). On the graph she is at the desired height and weight so we would say she is well-grown and in the right condition.

Heifer No. 2 is 10 months old. She is 115 cm (45 in.) tall and slightly above 200 kg (440 lb.). Both readings are below the line for her age but spaced to indicate good condition. This heifer is just too small for her age. If the heifers were penned together, a visitor would be impressed by both. However, on the graph, Heifer No. 2 cannot hide. Her lack of size stands out.

Heifer No. 3 is all right for stature, but is too fat. No. 4 is short and fat. Although Heifer No. 5 has adequate weight for her age, her general lack of stature makes her appear overconditioned. For a heifer of this height, the charted weight is too much.

Desirable Weights

Desirable weights and corresponding average daily gains (ADG) for heifers calving at 24 months are:

Breed	Desirable Weight Kg (lb.)	ADG Kg (lb.)
Holstein/Brown Swiss	525 to 575 (1150 to 1275)	0.72 (1.6)
Ayrshire/Guernsey	450 to 500 (1000 to 1100)	0.62 (1.4)
Jersey	375 to 400 (825 to 875)	0.50 (1.1)

Growth rate following weaning to six to eight months of age is more rapid than at any other age. Desirable ADGs from **weaning to six to eight months** for calves classed as having either large frames or small to medium-sized frames within each breed are:

Breed	ADG — Small to Medium Size Kg (lb.)	ADG — Large Size Kg (lb.)
Holstein/Brown Swiss	0.77 (1.7)	0.90 (2.0)
Ayrshire/Guernsey	0.64 (1.4)	0.75 (1.65)
Jersey	0.55 (1.2)	0.65 (1.45)

Grain feeding levels for small to medium-sized framed calves would be about 20 to 25 percent lower than those levels recommended for larger framed calves.

Daily gains gradually reduce to 0.5 to 0.6 Kg (1.1 to 1.3 lb.) at 18 to 20 months of age through to calving.

Desirable Heights

Desirable heights at the withers of two year old heifers in the three groups are:

Breed	Desirable Height (24 months) cm	(in.)
Holstein/Brown Swiss	137 to 142	(54 to 56)
Ayrshire/Guernsey	132 to 137	(52 to 54)
Jersey	125 to 130	(49 to 51)

For any of the large breed heifers to reach desirable stature at 24 months, they must be expected to grow 37 cm (15 in.) from birth to six months of age, and 15 cm (six in.) from six months to 12 months of age. Well-grown heifers at one year of age are capable of adding another 15 cm (six in.) to their height in the next 12 months.

Factors Influencing Growth

Five factors influencing heifer growth are **nutrition, management, housing, health** and **genetics.** Size is a highly inherited trait and visible improvement can be expected in one generation. A 1980-82 Eastern Ontario heifer management study concluded that approximately 30 to 40 percent of the variation in both height and weight was due to genetic differences. The remaining variation can be attributed to other four factors listed above. When proper attention is given to all five factors, the growth pattern is favourable. However, if one is neglected, it becomes stressful and sufficient stress can retard size and stature permanently. Refer to the factsheets *Dairy Calf Management: Birth to Weaning,* and *Dairy Heifer Management: Weaning to Calving* for a more detailed discussion of these factors.

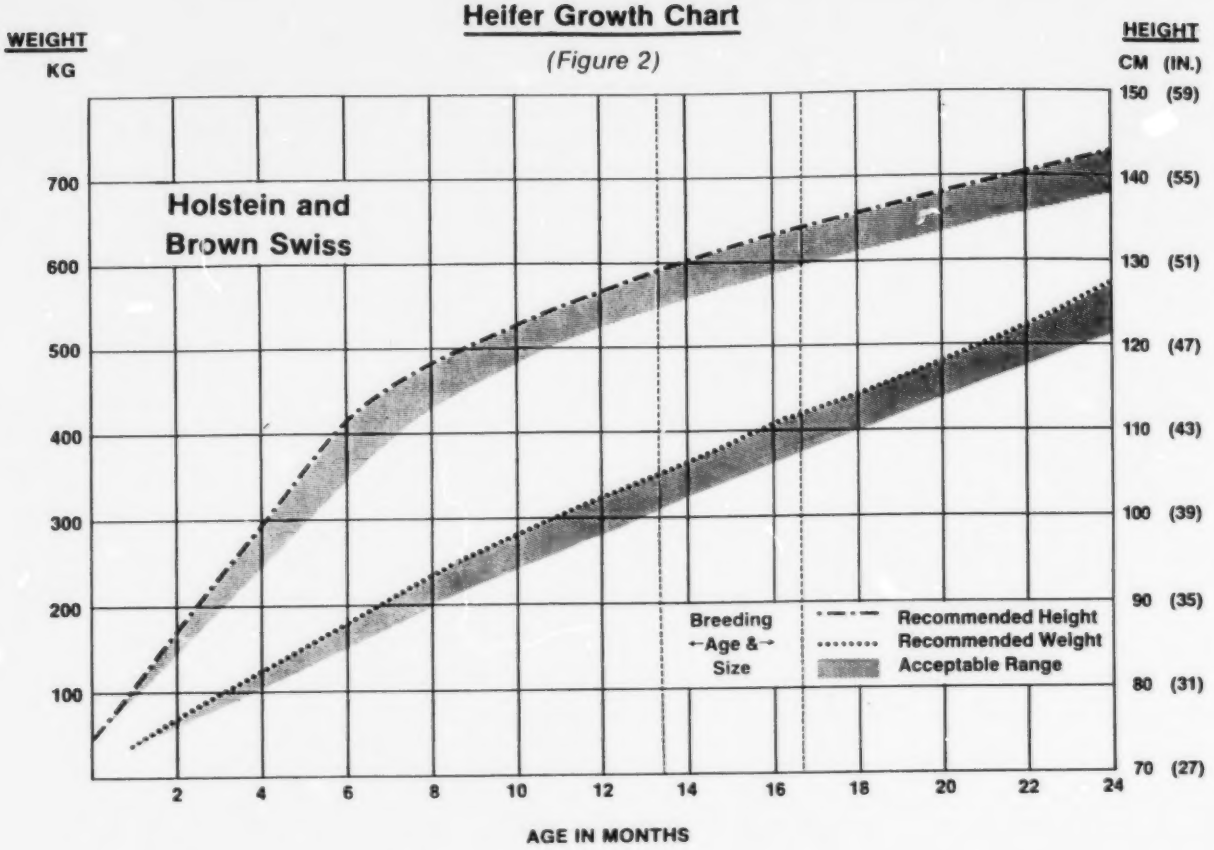
Table 1.
Growth Guides for Replacement Heifers

Age Mos.	Holstein & Brown Swiss		Ayrshire & Guernsey		Jersey	
	Ht. at Withers	Wt.	Ht. at Withers	Wt.	Ht. at Withers	Wt.
	cm	kg	cm	kg	cm	kg
Birth	75	42	70	30	66	25
1	78	54	76	40	72	32
2	86	73	84	55	78	50
4	100	127	94	97	88	85
6	112	182	106	142	100	132
8	118	235	111	187	105	170
10	123	280	115	230	110	207
12	127	323	119	270	112	240
14 ↑ Breeding Age	130	366	122	310	115	268
16 ↓ & Size	133	408	127	350	118	295
18	136	450	129	390	120	316
20	138	488	132	430	124	340
22	141	525	135	465	127	365
24	142	575	137	500	130	390

Note: 2.54 cm = 1 in. 1 kg = 2.2 lb.

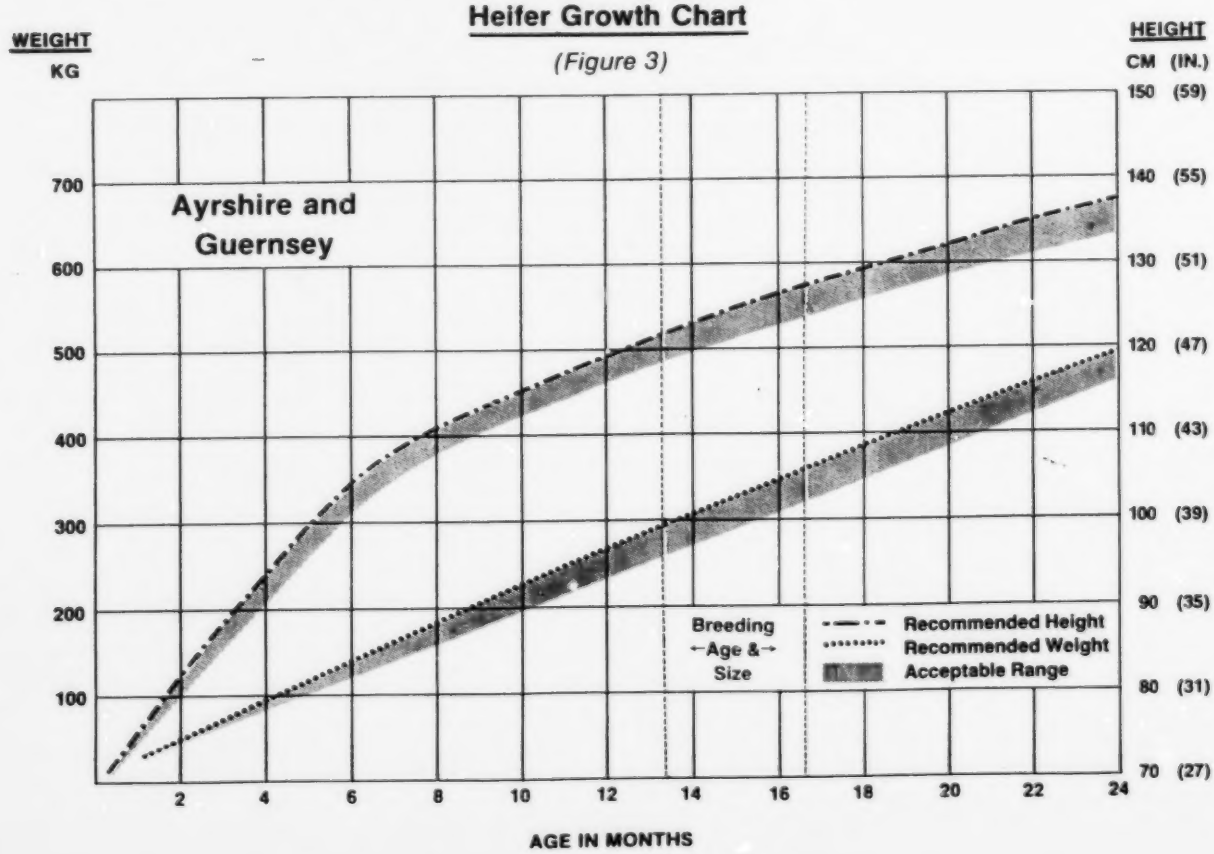
Heifer Growth Chart

(Figure 2)



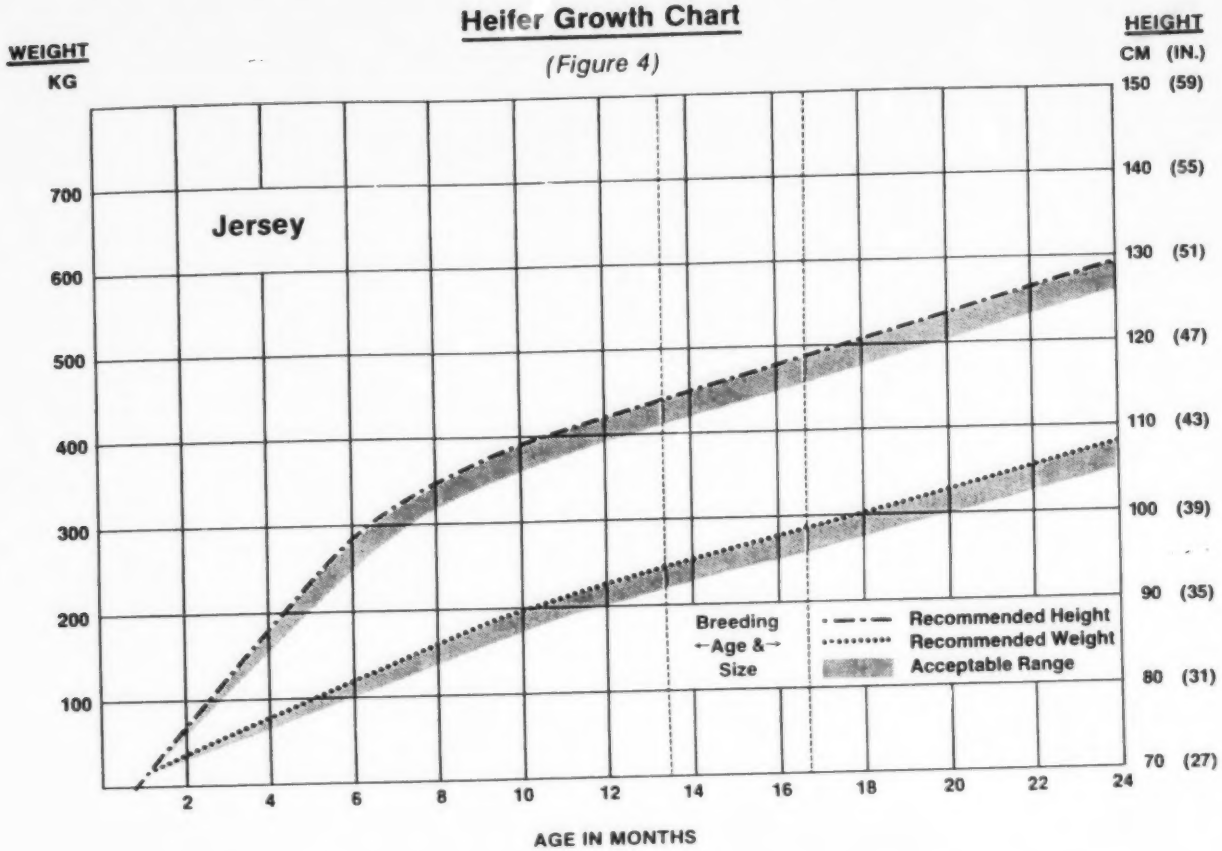
Heifer Growth Chart

(Figure 3)



Heifer Growth Chart

(Figure 4)



Heifer Appraisal Form
(Table 2)

Date (D/M/Y)	Heifer I.D.	Birth Date (D/M/Y)	Age (mos.)	Height (cm)	Weight (kg)	Sire (DSC)				Dam					Condition Score and Remarks (1-thin to 5-fat)
						Milk Rating	% Fat Dev.	Size Rating	Stature Rating	BCA Milk	BCA Fat	% Fat	Size (s/m/l)	Stature	

Charting — A Management Tool

The first chart will provide the dairy producer with the growth pattern of his heifers. A second chart, six or 12 months later, will reveal the same picture if no changes have been made. When improvements are made in feeding, grouping, etc., a change in pattern will be picked up on the next graph. The height graph is very sensitive in picking up the negative factors. Good managers chart heifer growth at six-month intervals.

Charting is an **excellent management tool** in developing the "right kind" of cows from your heifer crop. This will be accomplished if the lines on the graph represent the average growth of the heifers on your farm.

References for Developing the Growth Charts

- *Extension Circular EC 622,* University of Nebraska
- *Accelerated Growth and Early Breeding of Holstein Heifers* by R.W. Gardiner, J.D. Schuh, and L.G. Vargus, University of Arizona, Journal of Dairy Science, 1976.
- The National Research Council: *Nutrient Requirements of Dairy Cattle, 1978.*
- *All-Silage Programs for Dairy Cattle: Heifer Performance from Birth to Eighteen Months of Age,* D.G. Grieve, J.B. Stone, G.K. MacLeod, and R.A. Curtiss, University of Guelph, Journal of Dairy Science, 1976.
- *Body Measurement and Feed Intake of Holstein Heifers,* David Murray, Ridgetown College of Agricultural Technology.

Acknowledgement

This factsheet was revised from a 1982 Ontario Ministry of Agriculture and Food factsheet titled *Charting Heifer Growth,* with assistance from Manitoba Agriclture livestock specialists and Ontario Agriculture dairy specialists.

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For Further Information

Refer to the following Manitoba Agriculture factsheets:

- *Dairy Calf Management: Birth to Weaning*
- *Dairy Heifer Management: Weaning to Calving*
- *Dairy Heifer Budgeting Guide*
- *Heifer Growth Chart*